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10/622,511	07/21/2003	Osamu Shimamura	50195-376	3790

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600 13th Street, N.W.
Washington, DC 20005-3096

EXAMINER

LEE, CYNTHIA K

ART UNIT	PAPER NUMBER
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1745

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08/09/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/622,511

Applicant(s)

SHIMAMURA ET AL.

Examiner

Cynthia Lee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3,6-12,14-16 and 18 is/are pending in the application.
- 4a) Of the above claim(s) 18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3,6-12 and 14-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office Action is responsive to the amendment filed on 6/8/2007. Claims 1-3, 6-12, 14-16, and 18 are pending. Claim 13 has been canceled. Claim 18 is withdrawn from further consideration as being drawn to a non-elected invention.

The Claims Objection has been withdrawn.

The 35 USC 112, 2nd paragraph rejection has been withdrawn.

Applicant's arguments have been considered, but are not persuasive. Claims 1-3, 6-12, 14-16, are finally rejected for reasons of record.

Claims Analysis

Regarding the preamble "automobile" in claim 1, it has been considered does not add to the patentability of the claim because it does not impart structural limitations to the claim. It is noted that the prior art of record is capable of functioning as an automobile cell.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 6-12, 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shibuya (US 6291098) in view of Murai (US 6444355), Takami (US 6544682), and Yata (US 6902847).

Shibuya discloses a thin type cell (or a stack-type cell) comprising a positive electrode having a positive electrode active substance layer, a negative electrode having a negative electrode active substance layer, and a separator interposed between the positive electrode and the negative electrode, the positive electrode, the negative electrode and the separator being stacked in a stack direction to allow the positive electrode and the negative electrode, opposing to the positive electrode via the separator. See Fig. 1 and 3. The cell outer sheath is made from a laminate film composed of polymer and metal and welded to gas-tightly encapsulate the electric power generating element inside the cell outer sheath such that the cell is formed in a flat shape. It further consists a positive electrode terminal lead electrically conductive with the positive electrode and sandwiched between welded portions and extending to an outside of the cell outer sheath. The same applied for the negative electrode terminal lead.

Shibuya discloses that the anode comprised coating the active material onto copper foil with a total thickness of 200 μm (8:1-30). Shibuya does not disclose the thickness of the nickel foil current collector. However, Takami discloses of using a copper foil current collector for the negative electrode with a thickness of 10 μm . It would have been obvious to one of ordinary skill in the art at the time the invention was made to make Shibuya's negative electrode current collector with a thickness of 10 μm because both Shibuya's and Takami's are wound batteries and for the benefit of keeping the thickness relatively low to keep the resistivity low.

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Shibuya discloses that the cathode with an active material coated on an aluminum net current collector has a thickness of 130 μm . Shibuya does not disclose the dimensions of the aluminum net current collector, but Murai teaches that the current collector comprises aluminum net is $\sim 30\mu\text{m}$ in thickness (7:10-15). It would have been obvious to one of ordinary skill in the art at the time the invention was made to make Shibuya's current collector of $\sim 30 \mu\text{m}$ because it's commonly known in the art to use an aluminum current collector with this dimension to conduct current in a wound battery.

Although Shibuya does not disclose the thickness of the separator and the electrolyte, adding the thickness of the cell components, which include the sheath (89 μm), positive electrode (130 μm), negative electrode (200 μm), positive terminal (110 μm), negative terminal (110 μm), and dividing by the thickness of the positive and negative active material layer yields no greater than ~ 4 , which is well below 80. See 6:55-67-7:1-15. Thus, when one were to include the separator and the electrolyte thickness, the ratio would not be greater than 80. However, absent specific thickness of the separator and the electrolyte, it is obvious that one of ordinary skill in the art would form the separator and the electrolyte of comparable dimensions as the electrode and the terminal and thus, yielding a ratio not greater than 80.

Shibuya discloses that the ratio of the thickness of the cell divided by the thickness of the active substances is 3.64, and not equal to or greater than 10 and equal to or less than 80 (applicant's claim 1). However, Takami teaches that the positive electrode layer and the negative electrode layer each has a thickness between 10 μm and 150 μm . Takami teaches that where the thickness of the electrode layer is

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set to fall within a range of between 10 um and 150 um, it is possible to improve the large discharge characteristics and the cycle life (4:25-35, 5:35-45). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make Shibuya's and Murai's battery with the electrode layer thickness between 10 and 150 um for the benefit of improving the cycle life of the battery, as taught by Takami. Making Shibuya's battery as modified by Murai with the active material thickness as taught by Takami would yield a ratio of the thickness of the cell by the thickness of the active substances as high as 36.4, thus meeting claim 1.

Shibuya modified by Takami and Murai results in the thickness of the anode active substance of 190 um and the thickness of the cathode substance of 100 um. Shibuya modified by Takami and Murai does not disclose that at least one of the thickness of the active substance layer is equal to or greater than 20 um and equal to or less than 80 um (applicant's claim 10). However, Takami teaches that where the thickness of the electrode layer is set to fall within a range of between 10 um and 150 um, it is possible to improve the large discharge characteristics and the cycle life (4:25-35, 5:35-45). It would have been obvious to one of ordinary skill in the art at the time the invention was made to vary the thickness of the electrode active layers, hence varying the distance from the surface of the electrode to the separator, for the benefit of improving the cycle life of the battery.

Takami discloses that the thickness of the active material affects discharge characteristics, thus clearly teaching that the active material thickness is a result effective variable. It has been held by the courts that discovering an optimum value or

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workable ranges of a result-effective variable involves only routine skill in the art, and thus not novel. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). See MPEP 2144.05. It has been held by the courts that where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Swain et. al., 33 CCPA 1250, 156 F.2d 239, 70 USPQ 412. In the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists, see MPEP 2144.05. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. See MPEP 2144.05.

The dimensions of the sheath are 8 cm by 10 cm (applicant's claim 2). The discharge current of the cell is 0.25 mA/cm² for 10 weeks or 190 cm²/Ah (See fig. 16 and 9:5-10) (applicant's claim 3). The terminal leads are made from carbon, nickel, aluminum, copper, tungsten, stainless steel, iron, silver, gold, alloys thereof (4:1-5) (applicant's claim 9). Shibuya discloses that the cell outer sheath is made from a pair of laminate films (6:55-65) (applicant's claim 11).

Shibuya does not disclose that the value obtained by dividing a thickness of the electrode terminal lead along the stack direction by a sum of a total thickness of the electrode current collector in a cell is equal to or greater than 0.4 and equal to or less than 2.0 for positive and negative electrode (applicant's claim 1). However, Shibuya discloses that the thickness of each electrode terminal is 110 um. The Shibuya

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modified by Murai would result in ~ 30 um for the aluminum net (as stated above).

Shibuya modified by Takami would result in ~10 um for the copper foil (as stated above). Yata teaches a stack-type cell wherein several cells are stacked (fig 2). The Examiner notes that stacking multiple cells together is common in the battery art to increase the capacity. One of ordinary skill in the art would be motivated to stack several unit cells together, as taught by Yata, to increase the cell capacity, thus yielding a ratio as claimed by the applicants. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to connect several unit cells for the benefit of increasing the cell capacity, thus possessing the ratio of thickness of the terminal and the total of current collectors as claimed by the applicants. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. See MPEP 2144.05.

The cathode terminal dimensions are 5mm by 3mm (applicant's claims 6 and 7). Further, Shibuya discloses that the width and the length of the electrode terminals are matched to the shape of the cell. Preferably, the width and the length are selected so that the voltage generated across both ends of the electrode terminals used as cells will be not higher than 1/100 of the nominal voltage of the cell (5:25-30). Further, for preventing short-circuiting, the thickness of the electrode terminal may be set so as to be smaller than that of the sheath (4:49-51). Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the electrode

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terminal dimensions in accordance with the sheath dimensions for the benefit of enclosing the terminal in the sheath. Generally, differences in ranges will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such ranges is critical. See MPEP 2144.05.

Shibuya's positive and negative electrode terminals extend to the outside from opposing sides of the cell outer sheath (applicant's claim 8).

Shibuya does not disclose that the cell outer sheath is made from one sheet (applicant's claim 12). Shibuya discloses that the cell outer sheath is made from two sheets. However, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make the cell sheath from one sheet instead of two sheets for the benefit of easier sealing.

Shibuya does not explicitly disclose that more than one cell is connected in series or parallel (applicant's claim 14). Shibuya discloses only one cell. However, this limitation substantially encompasses the two electrical connections known in the electrical field. Further, it's commonly known in the art to join several cells together for the benefit of increasing the output voltage or current. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add several cells and connect them in series or in parallel, depending on if the voltage or the current needs to be increased.

It is commonly practiced in the art that a bus bar is used to connect electrode terminal leads (applicant's claim 15). It is noted that the common knowledge is taken to

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be admitted prior art because applicant failed to traverse the examiner's assertion. See MPEP 2144.03 C.

It is further noted that when more than one cell is connected in series or on parallel, they are either stacked or positioned side by side (applicant's claim 16).

The limitation "automobile" has been considered, but it adds nothing to the patentability of the present claims because it is recited in the preamble. Additionally, Shibuya's cell (flat type cell) has substantially the same configuration of applicant's cell (stack-type cell). It also recites an intended use for the cell.

Shibuya as modified by Murai do not disclose that the cell is wound (applicant's claim 13). However, Takami discloses that the cell is wound. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to wind the cell components for the benefits of creating a higher energy density cell.

Response to Arguments

Applicant's arguments filed 6/8/2007 have been fully considered but they are not persuasive.

Applicant asserts that Takami and Murai are directed to wound cells while Shibuya is directed to a stack-type cell, and thus one of ordinary skill in the art would not look towards the wound cell teaching of Murai and Takami (pg 11).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the

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references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). Since Shibuya, Murai, and Takami are all in the field of applicant's endeavor and one type of cell is not taught away from another type of cell, the Examiner notes that the combination is proper.

In response to Applicant's arguments to claim 1, 37 CFR 1.111(b) states, "A general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references does not comply with the requirements of the section." Applicant has failed to specifically point out how the language of the claims patentably distinguishes them from the references.

Applicants' arguments are only statements with no evidentiary support as to why the art rejections of record do not meet all the claimed limitations. Applicants have not specifically pointed out the errors of the Examiner's art rejections. Applicant must discuss the references applied against the claims, explaining how the claims avoid the references or distinguish from them.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cynthia Lee whose telephone number is 571-272-8699. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


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PRIMARY EXAMINER